विद्या सर्वार्थ साधिका

ANANDALAYA
PREBOARD EXAMINATIION
Class: X

Subject: Mathematics - Basic (241) M.M: 80
Date : 23 – 12–2025 Time: 3 hours

General Instructions:

Read the following instructions carefully and follow them:

1. This question paper contains 38 questions. All Questions are compulsory.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Questions no. 1-18 are multiple choice questions (MCQs) and questions no. 19 and 20 are Assertion- Reason based questions of 1 mark each.
4. In Section B, Questions no. 21-25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, Questions no. 26-31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Questions no. 32-35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Questions no. 36-38 are case study based questions carrying 4 marks each with sub parts of the values of 1, 1 and 2 marks each respectively.
8. There is no overall choice. However, an internal choice in 2 Questions of Section B, 2 Questions of Section C and 2 Questions of Section D has been provided. An internal choice has been provided in all the 2 marks questions of Section E.
9. Draw neat and clean figures wherever required. Take π =22/7 wherever required if not stated.
10. Use of calculators is not allowed.

SECTION – A

1. The exponent of 5 in the prime factorisation of 3750 is ___. (1)
   (A) 3 (B) 4 (C) 5 (D) 1

2. If $tan\theta = \frac{1}{\sqrt{3}}$, then the value of $7\ sin^2\theta + 3\ cos^2\theta$ = _____. (1)
   (A) $\sqrt{3}$ (B) $\frac{\sqrt{3}}{2}$ (C) 16 (D) 4

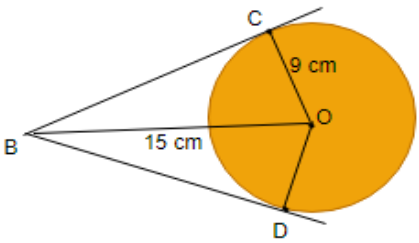
3. If $A\ and\ B$ are the points $(-6, 7)$ and $(-1, -5)$ respectively, then find the distance $3AB$. (1)
   (A) 13 (B) 39 (C) 169 (D) 12

4. HCF of $5^2 \times 3^2$ and $3^5 \times 5^3$is:_____. (1)
   (A) $5^2 \times 3^2$ (B) $5^5 \times 3^2$ (C) $5^3 \times 3^5$ (D) $3^2 \times 5^2$

5. The value of $4\ cot^2\ 45° - \sec^2 60° + sin^2\ 60° + cos^2\ 90° =$ _____. (1)
   (A) $\frac{4}{3}$ (B) $\frac{3}{4}$ (C) $-\frac{4}{3}$ (D) $-\frac{3}{4}$

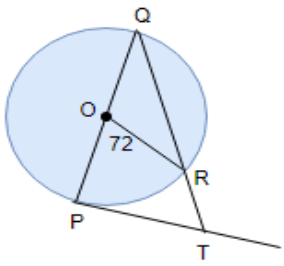
6. A quadratic polynomial whose one zero is 6 and sum of the zeroes is 0, is_____. (1)
   (A) $x^2 - 6x + 2$ (B) $x^2 - 36$ (C) $x^2 - 6$ (D) $x^2 - 3$

7. In the figure, BC and BD are tangents to the circle with centre O and radius 9 cm. If OP = 15 cm , then the length of (BC + BD) = _____ cm. (1)



   (A) 18 (B) 12
   (C) 24 (D) 21

8. In the given figure, PQ is a diameter of a circle with centre O and PT is a tangent at P, QT meets the circle at R. If ∠POR = 72° then ∠PTR= ____. (1)



(A) 52° (B) 60°
(C) 54° (D) 64°

9. Determine k for which the system of equations has infinite solutions: (1)
$4x + y = 3$ and $8x + 2y = 5k$.
(A) $\frac{6}{5}$ (B) $\frac{3}{2}$ (C) $\frac{5}{6}$ (D) $\frac{1}{2}$

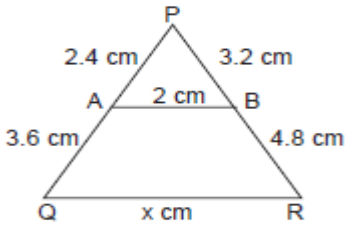
10. Find the roots of the quadratic equation $x^2 - 3x = 0$. (1)
(A) $1, 3$ (B) $0, 3$ (C) $-1, 3$ (D) $3\ only$

11. Write the nature of roots of the quadratic equation $9x^2 - 6x - 2 = 0$. (1)
(A) two unequal real roots (B) equal and real roots
(C) no real roots (D) none of these

12. The 15^{th} term of the sequence $x - 7,\ x - 2,\ x + 3,$ ..... is = _____. (1)
(A) $x + 63$ (B) $x - 63$ (C) $x + 73$ (D) $x + 70$

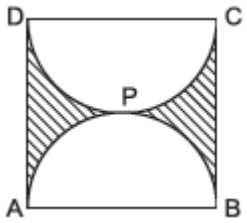
13. A die is thrown once. What is the probability of getting a number greater than 4? (1)
(A) $\frac{1}{3}$ (B) $\frac{2}{3}$ (C) $\frac{1}{6}$ (D) $\frac{1}{2}$

14. In the given figure, $AB \parallel QR$, The value of x (in cm) is _____. (1)



(A) 1 (B) 2
(C) 5 (D) 6

15. Find the perimeter of the shaded region in figure, if ABCD is a square of side 14 cm and APB and CPD are semicircles. [Use $\pi = \frac{22}{7}$] (1)



(A) $70\ cm$ (B) $72cm$
(C) $62cm$ (D) $42cm$

16. If $\Delta\ ABC$ and $\Delta\ DEF$ are similar triangles such that $\angle A = 57°$ and $\angle E = 83°$. Find $\angle C$. (1)
(A) 20° (B) 30° (C) 40° (D) 60°

17. If the mode of 12, 16, 19, 16, x, 12, 16, 19, 12 is 16, then the value of x is _____. (1)
(A) 12 (B) 16 (C) 19 (D) 25

18. In $\Delta\ ABC$ and $\Delta\ DEF$, if $\angle A = \angle D$, $\angle B = \angle E$ and $\angle C = \angle F$, then $\Delta\ ABC$ and $\Delta\ DEF$ are similar. symbolically we write it as_____ (1)
(A) $\Delta ABC = \Delta DEF$ (B) $\Delta ABC \cong \Delta DEF$
(C) $\Delta ABC - \Delta DEF$ (D) $\Delta ABC \sim \Delta DEF$

In the question no. 19 & 20, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.
(A) Both A and R are true and R is the correct explanation of A.
(B) Both A and R are true but R is not the correct explanation of A.
(C) A is true but R is false.
(D) A is false but R is true.

19. A: If HCF $(a, 8) = 4$, LCM $(a, 8) = 24$ then the value of $a = 12$. (1)
R: For any two positive integers a and b , $HCF\ (a, b) \times LCM\ (a, b) = a \times b$.

20. A: The 20^{th} term of the AP 7, 3, $-1, -5$ ... . is 69. (1)
R: The n^{th} term of an AP is $a_n = a + (n - 1)d$.

SECTION – B

21. How many terms of the A.P. 18, 16, 14, ... be taken so that their sum is zero? (2)

OR

In an AP, if a = 3, n = 8, $S_n = 192$, find *d*.

22. Find the perimeter of the triangle with vertices (0, 4), (0, 0) and (3, 0).. (2)

OR

Find the co-ordinates of a point A, where AB is the diameter of a circle whose centre is $(2, -3)$ and $B\ is\ (1, 4)$.

23. If $12 \tan\theta = 13$, then the value of $\frac{\sin\theta - cos\theta}{sin\theta + cos\theta}$. (2)

24. The two tangents from an external point P to a circle with centre O are PA and PB. If ∠ APB = 70°, what is the value of ∠ AOB? (2)

25. Calculate mode of the following data: (2)

Marks	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100
No. of students	8	10	12	6	3

SECTION – C

26. Solve the following system of linear equations graphically: (3)
$4x - 5y - 20 = 0, 3x + 5y - 15 = 0$.

27. Find the coordinates of the point which divides the line segment joining the points A (4, – 3) and B(8, 5) in the ratio 3 : 1 internally. (3)

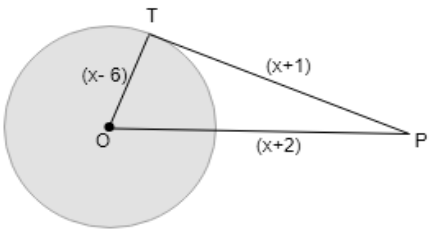
OR

Find the point on *y*-axis which is equidistant from the points C (5, – 2) and D (–3, 2).

28. Find the values of *p* and *q* so that the prime factorisation of 2520 is expressible as (3)
$2^3 \times 3^p \times q \times 7$

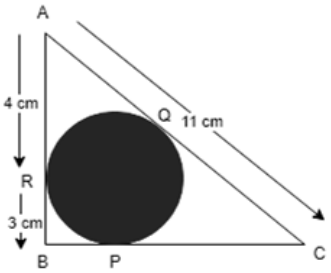
29. Prove that: $\sqrt{\frac{1+sinA}{1-sinA}} + \sqrt{\frac{1-sinA}{1+sinA}} = 2\ secA$. (3)

30. In the below figure, O is the centre of the circle and PT is a tangent, find the area of Δ OTP. (3)



OR

In the figure, Δ ABC is circumscribing a circle. $AC = 11\ cm,\ AR = 4\ cm\ and\ BR = 3cm$ Find the length of BC.



31. The mean of the following distribution is 18. Find the frequency *f* of the class 19 – 21. (3)

Class	11–13	13–15	15–17	17–19	19–21	21–23	23–25
Frequency	3	6	9	13	f	5	4

SECTION – D

32. Using quadratic formula, solve the quadratic equation: $5x^2 - 9x - 14 = 0$. (5)

OR

A passenger train takes 2 hours less for a journey of 300 km if its speed is increased by 5 km/hour from its usual speed. Find the usual speed of the train.

33. A person standing on the bank of a river observes that the angle of the elevation of the top of a tree standing on the opposite bank is 60°. When he moves 40 m away from the bank, he finds the angle of elevation to be 30°. Find the height of the tree and the width of the river. ($\sqrt{3}$ = 1.732). (5)

OR

A statue 1.46 m tall stands on the top of a pedestal. From a point on the ground, the angle of elevation of the top of the statue is 60° and from the same point, the angle of elevation of the top of the pedestal is 45°.

(i) Find the height of the pedestal.

(ii) Find the distance of the point from the foot of the pedestal. (Use $\sqrt{3}$ = 1.73)

34. If a line is drawn parallel to one side of a triangle, the other two sides are divided in the same ratio, prove it. (5)

35. A solid is in the form of a cylinder with hemispherical ends. The total height of the solid is 19 cm and the diameter of the cylinder is 7 cm. Find the volume and surface area of the solid. $\left[\pi = \frac{22}{7}\right]$ (5)

SECTION – E

36. On a weekend Rani was playing cards with her family. The deck has 52 cards. If her brother drew one card.

(i) Find the probability of getting a king of red colour. (1)

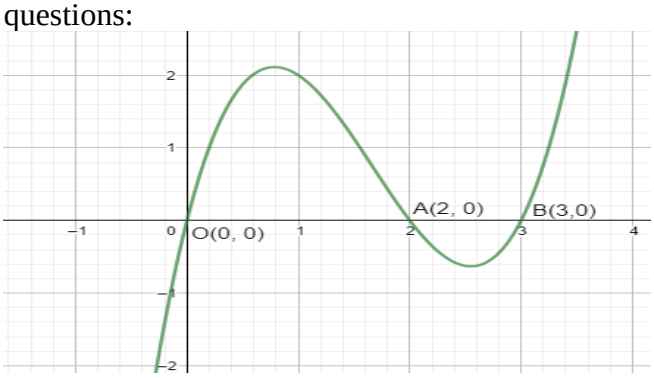
(ii) Find the probability of getting a face card. (1)

(iii) Find the probability of getting a jack of hearts. (2)

OR

(iii) Find the probability of getting a red face card

37. Students of a class were shown the below graph. Observe the graph, and answer the following questions:



(i) In the graph, how many zeroes are there for the polynomial? (1)

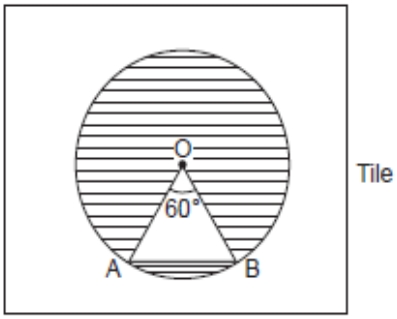
(ii) The zeroes of the polynomial are _____ (1)

(iii) If α and β are zeros of the quadratic polynomial $x^2 - 8x + k$, find k if $\alpha^2 + \beta^2 = 40$ (2)

OR

(iii) Find the zeroes of the quadratic polynomial $9t^2 - 6t + 1$

38. In the middle of a tile there is a coloured circular portion as shown. The radius of coloured position is 21 cm. The uncoloured portion (unshaded portion) subtends angle 60° at the centre as shown OA is radius. Answer the questions based on above information.



(i) What is the length of the arc AB? (1)

(ii) What is the area of minor sector AOB? (1)

(iii) Find the area of minor segment corresponding to chord AB? (2)

OR

(iii) Find the area of major segment corresponding to chord AB?